



Advanced Electronic Applications, Inc.

Dear Potential Packeteer:

Thank you for your interest in Packet Radio and our Model PKT-1 Packet Controller.

If you responded to our recent advertising about the PKT-1 by returning the magazine coupon, you may have indicated that you would like to be called. We are working our way through the calls in the order they were received and hope to talk to you soon. In the meantime, I am enclosing the material mentioned in the ad. Study it, as when we call, there may be a "snap quiz" (hi!).

The KE3Z article contains some interesting reading material on the second page. I would recommend the Lyle Johnson series of three articles, the third being also in "73" — January 1984. Any one of the Networking Conference proceedings contains many papers that are indicative of the state of the art in packet. Additionally, a TAB paperback called "Packet Radio" published in 1981 gives a good layman's introduction to Packet Radio.

The section called "Common Packet Radio Questions" is a quick introduction to the subject. If you would like to copy it for distribution to your club, please feel free to do so—just credit AEA if you would.

The "Gateway" and "Packet Status Register" newsletters are copies of the front pages of typical issues. The reverse side in each case contains membership/subscription information. I would strongly recommend you join, as the two newsletters contain much of "what's going on" in the packet radio area.

Another way to keep up with the movement is to join one of the voice nets mentioned on the back of the "Gateway." Remember that the frequencies may change—I think they are current. And you should check in with a local club—there are some names of some of the larger ones included. Many have formed in the last 6 months. Ask the local RTTY guys in your area if there is packet activity—they usually know, as many of the new packeteers are converts from RTTY.

We have available VHS and Beta formats of a video tape of a presentation to a radio club by Pete Eaton, WB9FLW. Pete goes through the basics of packet radio with overhead slides and hardware and entertains questions from the club afterwards. The tape takes upwards of an hour. We will be happy to copy it onto your tape (if you send us one) with a check for \$3.50 to cover postage and VCR rental.

Most people are able to simply take a computer they already have (such as a Commodore 64, IBM PC, Apple II) and add an asynchronous (translate "RS-232") port by plugging it in an RS-232 card. They then procure (from their computer dealer) a \$20-\$40 piece of software called a "terminal program" which allows the computer to send and receive ASCII characters over the RS-232 cable connecting the PKT-1 and the computer. (If you are using a telephone modem to connect your computer to a phone bulletin board, you already possess the terminal program, port and RS-232 cable). They then take the cable supplied with the PKT-1 and connect audio in and out and PTT from the (2 meter) radio to the PKT-1. This is as simple as putting a mic connector on the end of the cable and plugging it into the mic jack of the radio, and connecting the audio from the radio speaker jack to the audio in jack on the PKT-1. You then turn everything on, and if your radio has typical mic sensitivity (and you don't need to adjust for correct deviation) AWAY YOU GO!

We are really excited about Packet Radio here at AEA and are looking forward to doing whatever we can to help you!

Sincerely,

John Gates
N7BTI

COMMON PACKET RADIO QUESTIONS

Q. What is packet radio?

A. Packet radio is a means of digital communications somewhat similar to RTTY or AMTOR. The major differences are:

- a) Many people can be communicating simultaneously. A standard 1200 baud packet channel can support about 15 QSO's simultaneously and each will have the equivalent throughput of at least 60 WPM.
- b) It is a point-to-point medium rather than a broadcast medium. Think of it as a telephone rather than a radio. There is a broadcast feature, but the error correction capability of the system is disabled.

Packet radio works like this: you type a command to your AEA PKT-1 Packet Radio Controller, known as a terminal node controller (TNC), telling it to connect to someone and then wait for a few seconds. It will respond by telling you "****CONNECTED TO WA7XYZ." At this point your two stations are connected together as if by telephone. Whatever data you send appears at the other end and whatever he sends appears at your end. No one else on the channel is interfered with by your transmission. Many people can be using the channel simultaneously and not know it. As mentioned above, you can have many QSO's in progress and get good throughput on each one!

Through all this, the PKT-1 is breaking your transmission into pieces called packets, each up to 128 characters long. Each packet contains a header that tells who the packet is for and from whom it came. It also contains additional information to make it possible for the receiving TNC to determine if the information has been damaged so that the TNC can request that the errored packet be resent. In this way packet radio is much like AMTOR, only it transfers data at a much greater speed and several people can operate simultaneously on the same frequency.

For those who are interested in computer communications, the error free capability allows you to send a computer program and data from one station to another without errors. Also it does not cause garbage to print out on the screen or paper of those to whom it is not addressed.

Q. What code is used?

A. ASCII is the standard character set used, but some TNC's will interface with Baudot/Murray code machines. Most TNC's have a transparent mode wherein any code may be sent between stations.

Q. What hardware do I need?

A. All you need is a transceiver that will operate on the proper frequency; a terminal, teleprinter, or personal computer with an appropriate interface (usually an RS-232 port); and an AEA PKT-1 Packet Controller. Since many of you are currently using RTTY, you probably have the first two items and need only acquire the last.

Q. Do I need to write any software?

A. No. any terminal program for a PC will work. The TNC's

come already programmed. You might wish to procure a terminal program for your computer capable of up and down loading to disk or cassette.

Q. There is a lot of talk about packet radio from many different groups. Is there any standardization yet?

A. Yes. In October of 1982, AMSAT hosted a joint meeting of the major packet groups. Out of this meeting came the AX.25 standard which has now been endorsed by most of the major packet groups.

There was another "standard" protocol developed by the VADCG group in Vancouver, B.C., Canada. Up until recently the Vancouver protocol was more popular than AX.25, but that is changing rapidly. The AEA TNC has the ability to operate with either the Vancouver or AX.25 protocols.

Q. How reliable is it?

A. Due to the nature of packet radio, anything that makes it all the way to the output of the destination TNC is totally error free. Packets can be reliably transferred even when the channel is somewhat noisy.

Do we need a special repeater?

A. No. Packets can be sent through a standard voice repeater, simplex, or any other packet station can act as a repeater. Another packet station acting as a repeater is called a digipeater and requires no duplexers due to the simplex nature of packet radio.

Q. Will there be anyone else to talk to?

A. In addition to terrestrial communications, there is also a dedicated packet frequency on AMSAT OSCAR-10. Activity can be found there on the 145.830 scientific channel.

Q. Speaking of satellites, I have heard of something called "PACSAT." What is it?

A. PACSAT will be a new satellite designed for packet radio. The bird will have a microprocessor and 4 million bytes (characters) of memory. A ground station can send a message intended for another ham to the satellite. PACSAT will store the message in its memory until the other ham checks in and retrieves his messages. Consider it a "flying mailbox."

Q. Do I have to operate in the VHF spectrum?

A. No. There is packet activity in the HF spectrum. Below 21.25 Mhz speeds are limited to 300 baud unless you get a "Special Temporary Authority" (STA) waiver from the FCC. The FCC has been granted these waivers with some regularity and it is expected that the 300 baud limitation will be lifted soon. AMRAD has plans for a "Packet Adaptive Modem" that can change speeds as necessary to deal with QRM and QRN. The speeds it can use are 75, 150, 300, 600, and 1200 bauds. This modem is designed to work with the AMRAD TNC (see below), but can be adapted to work with any TNC

Advanced Electronic Applications, Inc.

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(206) 775-7373 • TELEX 152571 AEA INTL



PKT-1

Packet Radio Controller

SPECIFICATIONS

- Digital Radio Communication — computer to computer
- Every PKT-1 station is a Digipeater (repeater)
- Multiple conversations on a simplex channel
- Send computer files error free
- Simple to use — 5 usual commands
- Only extra equipment required is RS 232 terminal/ computer and radio
- Customer's 9-15 VDC power allows mobile/portable operation
- 1 year warranty and applications help
- No kit building — a complete Packet Controller
- Uses TAPR circuit and software
- Talk to more than 1000 stations on VHF, UHF, HF, Oscar, etc.
- 110-9600 Baud operation
- AX.25 and VADCG protocols
- Packet Newsletter and HF information net available
- Built-in calibration — no test gear needed
- Comprehensive operator's manual (tech manual available)
- 2 microprocessors allows non-interrupt operation
- Up to 64K on-board RAM/ROM for program/buffer/ message memory
- Easy hookup to radio and computer or terminal (4 wire MIC connector/RS232)
- Squelch input for busy channel Xmit inhibit

The PKT-1 provides an easy way for the Radio Amateur, government agency, or small business to set up error free data or computer file communication links with hard copy capability. In this age of computers and data base access, dedicated phone lines are expensive and regular ones are slow. Digital radio provides an alternative, and is more reliable than phone in the event of an emergency.

A Packet Radio station sends a fractional second burst of AFSK/FSK encoded (ASCII, etc.) data and message handling bytes in a "packet". The receiving station PKT-1 decodes the packet and sends it to a terminal or computer via RS232 where it is displayed, printed, or stored for later use.

The PKT-1 was developed in conjunction with the Tuscon Amateur Packet Radio group. It is a fully assembled and warranted DC-operable version of the TAPR kit board.

The PKT-1 packet controller provides several differences when compared to voice, RTTY or AMTOR modes. There is the capability of hard copy, and data is essentially error free. Multiple conversations can exist on a single channel (time division multiplexing). Store-and-forward digipeating through up to 8 regular PKT-1 intermediate stations



allows VHF communication over non line-of-sight paths or paths too long for single hop VHF.

Packets sent by the PKT-1 are error checked using Cyclic Redundancy Check (CRC) in the PKT-1. Because of the burst nature of packet, packets from other conversations fit in before and after your packets, and you see only those addressed to you.

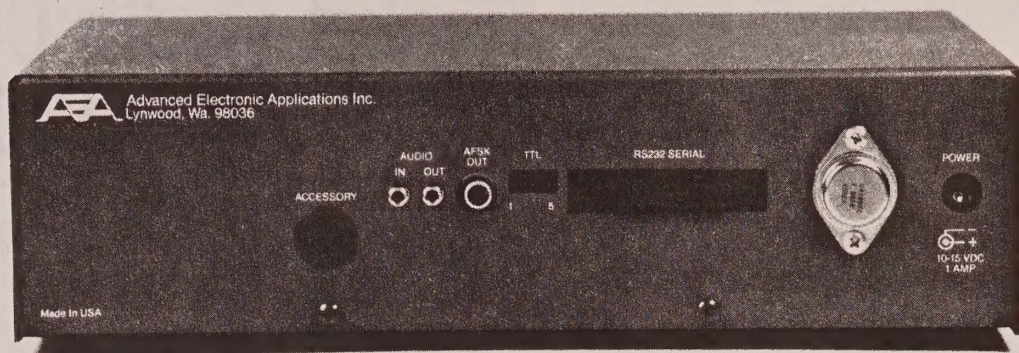
You may run modulation modes such as AFSK, FSK, PSK at HF, VHF, UHF, microwave and satellite frequencies. HF usually runs at 300 Baud, and VHF uses 1200.

The PKT-1 board contains a bypassable built-in Bell 202 style modem. It contains two processors, one of which encodes and decodes the packets. There is 32K of firmware, and 8K x 8 of static ram for buffering, as well as non-volatile ram for power-down storage of operating parameters. An RS232 interface is included, as well as sockets. The board is through-hole plated, nomenclated epoxy glass. Status LEDs and controls are on the front panel. Connection to the radio consists of PTT, audio in, and AFSK out. RS232 goes to the terminal or computer.

The PKT-1 will be supported as AEA and TAPR continue to improve the design. Applications assistance in getting started and operating is available to PKT-1 purchasers. There are over 1000 TAPR board owners now, with 20 users or so in a typical larger city, so there are plenty of people to talk to. You may subscribe to the Packet Status Register, a TAPR publication. There is also an HF voice net weekly with lots of operating hints.

Lots of bulletin boards exist, and you can leave or pickup your data and text messages, read information bulletins, and so forth. AEA can recommend terminal programs for your computer which will allow you to return to your station at day's end and read your mail.

The PKT-1 will input squelch info from your radio to inhibit xmit in the event the channel is busy with voice traffic. You may therefore coexist with voice traffic, (and on voice repeaters) with the operator's permission.



PKT-1 Rear View

MODEL PKT-1 PACKET CONTROLLER SPECIFICATIONS

Processors

- Motorola 6809 8 bit Microprocessor
- Western Digital 1933 HDLC (Highlevel Data Link Controller)

Input/Output

- RS232 (DB25S connector) serial port
Baud rates: 50 to 19200
Autobaud operation on 110, 300, 1200, 4800, 9600
- Power: see below
- PTT (push to talk) output for +PTT voltage radios
- Parallel Port (optional): 6520 PIA
- Audio In/loop thru output
- Squelch input for busy channel xmit inhibit

Memory

- ROM: 32K; 2764 program storage
- RAM: 8K; 6264 data buffer
- RAM: expandable to 32K
- NOVRAM: 128 bytes nonvolatile ram; Xicor 2212

Modem

- AFSK (1200, 2200 Hz), Bell 202
- 300 Baud HF, 1200 Baud VHF
- Onboard calibration routines
- Bypassable to use external modem
- Exar 2211 demod; 2206 AFSK generator; MF-10 4 pole switched capacitor filter

Protocols

- AX.25 and Vancouver VADCG, software switchable, full or half duplex radio data link

Operation Modes

- Command: accepts control commands via serial or parallel port
- Conversation: data input, packet T/R, editing (character/line/package deletion, input redisplay)
- Transparent: digital data input, transmit via packet completion timer, receive packets, no editing

Controls

- Switches: power on, hard reset, NOVRAM bank select, NOVRAM disconnect

Indicators

- LEDs: power on, audio carrier, data carrier detect, PTT (push to talk), transmit data

Power

- Connector: 3.5 mm, center pin positive
- Voltage: 9-15 volts DC
- Current: 1 amp, fused at 2 amp
- Overvoltage: fuse blows at 18 v DC
- Optional Power Supply: AEA Model AC-4 1A DC
- Reverse polarity protected



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An Introduction to Packet Radio

Jon Bloom, KE3Z
ARRL Laboratory Engineer

Perhaps you have heard or read of packet radio but are unsure just what this new mode is. Does the idea of error-free communication at high speed interest you? How would you like to use a remote computer to get propagation charts, satellite tracking data or leave messages for your friends? Or maybe just play a computer game? All of this, and more, is possible via packet radio.

No More "Hits"!

Packet radio is a digital communications mode. Don't be scared off by this impressive sounding phrase; old-fashioned RTTY is a digital mode too. So is CW in the most literal sense! A digital mode is simply one which is transmitted by sending a signal with only two states: on and off for CW, mark frequency and space frequency for RTTY. In fact, packet radio serves much the same purpose as RTTY but packet has a number of improvements that make it more versatile and useful. One of the major failings of RTTY is its susceptibility to errors. In other words, as signals fade or QRM appears the "print" suffers errors. When this occurs in a RTTY QSO it is impossible to determine what was actually supposed to be printed. This is probably the major area in which packet radio improves upon RTTY. When an error occurs in the received packet signal, it is detected, and the information is automatically retransmitted. In fact, retransmission of the information will keep occurring until the receiving station transmits an acknowledgement, or ACK, to the transmitter. Since the error-detection technique is very sophisticated, there is almost no chance of accepting erroneous information. This automatic repeat request is known as ARQ.

To make the ARQ system work, the transmitter must pause from time to time to allow the receiver to send its ACK. In packet radio, the transmitter will send a burst of information (a packet) to which the receiver will reply with an ACK signal if the packet was received without errors. If the transmitter does not get an ACK back, it waits a short time and then retransmits the packet. Unlike other digital modes such as RTTY and AMTOR, the packet station waits until it has a number of characters to send before transmitting. For "chat" type operation, the packet station will

generally transmit the information after a complete line has been typed or after a specified number of characters has been entered. The station then activates the transmitter, sends the information, goes back to receive mode and waits for the ACK. If the ACK is received right away, the transmitter will remain off until the next line is ready to be sent. So for much of the time neither of the stations are transmitting at all! It is this characteristic of packet radio which allows another benefit of the mode: channel sharing. It is not at all uncommon for two or three (or more) QSOs to be taking place on the same frequency at the same time! Of course, occasionally two stations will transmit at the same time and clobber one another, but because of the ARQ function they will each try again, and the information will get through. Since the VHF packet signals are sent at 1200 bauds (more than 20 times as fast as normal Baudot RTTY) it doesn't take too long to get the information through, either.

Protocols - The Bedrock of Digital Communications

To make packet radio work, all of the stations need to be using the same protocol. Again, don't let this term make you nervous. Hams have been using protocols for many years. A protocol is simply a defined way of doing things. The standard amateur message format is one example of a protocol. It exists so that all traffic handlers will know exactly what information is required to refer to a given message and so that the receiving operator will know what to expect next as the message is being received. Another protocol is the RTTY character frame. It has a particular make-up consisting of a start bit of specified frequency and length, five information bits in the proper sequence and a stop bit. Imagine the confusion if each station sent a different length start bit or sent the information bits in any convenient order! In packet radio, there are actually several protocols in use. Each of these protocols supports the operation of the protocol above it. We say "above" because of the way we look at how the packet protocols support one another. The model we use is the International Organization for Standardization (OSI) network reference model. This model shows seven layers of protocol.

In packet radio, the first protocol layer defines the way in which the information from the higher layers is sent as a sequence of mark and space frequencies (or amplitudes or phases) by the transmitter. On VHF, packet radio stations currently use Bell 202 modems to transmit and receive AFSK signals. Standards for HF use are still being developed.

The layer 2 protocol specifies how the information is converted to a sequence of bits and what information is sent by the two stations to insure that the packets will be printed in proper sequence and without errors. Layer 2 consists of two protocols. The first of these is an international standard known as High Level Data Link Control (HDLC). (Confused? Don't worry. You don't have to understand all of this background information to operate packet. It's just nice to have some idea what the packet experimenter types are talking about!) The second layer 2 protocol in use by amateurs is called AX.25 and is a variation of the commercially used X.25 standard layer 2 protocol. The major change which was made by the amateurs is the inclusion of call signs in each and every frame of the transmissions. As we mentioned before, more than one QSO can occur on a given frequency at the same time. How is a receiving station to know which of the transmissions are part of his own QSO? This is accomplished by addressing each frame with the call sign of the receiving station. The call sign of the transmitting station is included as well. Aside from the need of this addressing to make the protocol work, it makes it possible for stations monitoring the frequency to see who is transmitting. It also constitutes a legal station ID for FCC purposes. This eliminates the need for the operator to explicitly identify his station.

Packet Radio Today

Most of the packet-radio activity today is carried out using standard 2-meter FM radios. Along with the FM rig, the packet station consists of computer or video terminal and a terminal node controller (TNC). The TNC is a small microcomputer which executes the packet-radio protocols. It sends the information for display to the terminal or computer and gets the information to send from the same device. Several manufacturers now produce TNC kits and assembled units.

A repeater is commonly used to extend the range of VHF FM stations. Although a standard voice repeater may be used to repeat packet signals, there is a simpler way. The digipeater is a packet-only repeater. Along with the call sign of the transmitting and receiving stations, a packet frame may contain one or more digipeater call signs. When a digipeater receives an error-free packet frame it checks for the presence of its own call sign. If the call sign is found, the digipeater retransmits the frame. Since the digipeater does not operate in full-duplex mode, it requires only a single frequency. Also, it does not need any duplexer or sophisticated control circuitry as does a voice repeater. A digipeater need only consist of a standard 2-meter rig, a TNC and a good VHF location! With more than one digipeater address in the frame, the packet may be made to hop from one repeater to the next. Large distances may be traversed in this way.

The Future of Packet Radio

A packet network is formed when a number of stations can communicate with one another through a common set of communication links. A rudimentary network is formed when a number of stations are connected directly or through digipeaters. A more effective network would have the ability to intelligently repeat the frames along a route between the sending station and the destination station regardless of the distance between the endpoints. It is this facility that is the next major effort to be undertaken in packet radio. To accomplish this, a level 3 (network) protocol must be specified and implemented. The expectation is that level 3 should become a reality in 1985. As more packet stations come on the air, QSOs between far distant stations will be possible. Imagine using a 2-meter hand-held radio to communicate with stations across the country! Soon it will be possible.

Chewing the rag is close to the ham's heart, but that type of operation only scratches the surface of the potential of packet radio. Computerized server stations are providing bulletin-board and remotely operated computer services now. More esoteric servers will be built in the coming years. Such new possibilities as digitized voice and video have barely been explored to date, leaving plenty to do for both experimenters and users. The OSCAR satellites are being used for packet radio now. With the packet-radio satellite (PACSAT) scheduled for launch in 1986, space communications promises to play a big part in packet. The high frequencies have not been neglected either. Experimental packet transmissions on 10 and 28 MHz have proven the viability of packet as an HF mode. Improved techniques for HF use are being developed now. Expect to see packet on HF in a big way within a short time.

Amateur Radio is not being left behind in this age of the home computer revolution. Packet radio allows the amateur to combine his or her interest in the radio art with the high-tech world of computers. With the communication potential of amateur radio added to the information processing of the computer, the coming years should show a dramatic increase in the capability of the typical ham station. Get in on the ground floor now!

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PACKET STATUS REGISTER

JAN. 1984

Number 9



Tucson Amateur Packet Radio Corporation

The Tucson Amateur Packet Radio Corporation will be holding its annual meeting on February 4th, 1984, in Tucson, Arizona.

The morning session, from 10 AM until 12 Noon, will include introductory packet material for the newcomers to our ranks, along with an informative history of the TNC development.

After lunch, the meeting will convene at 1 PM for a more technical afternoon session. The focus of this session will be on level three protocols and linking. This is the area in which a tremendous amount of development work must be done to make packet a viable mode for serious, long-distance communications. If attendance warrants, separate, parallel sessions will be run at the tutorial as well as the advanced technical levels.

Other topics, including packet operation on OSCAR-10 and hf, will be covered.

Included in the afternoon session will be a description of the UoSAT-B Data Communication Experiment (DCE), a flying packet mailbox-in-space, that is scheduled for a 1 March 1984 (!) launch.

The meeting will conclude between the hours of 4 and 5 PM with the results of the Board of Directors election announced.

An unofficial packet dinner will be held after the meeting at a local restaurant, followed by the Board of Directors meeting at 7 PM.

If you plan on attending, please contact us via PO Box 22888 for the meeting location (which is currently being finalized). Talk-in will be done on 144.91 MHz simplex and on the 146.28/88 MHz repeater. We will be looking for you!

The number of telephone calls being received by TAPR here in Tucson has gotten quite large. We like hearing from you and talking about packet radio, however, please understand that this is only a hobby for us and we must work at other endeavors for a living. The number of telephone calls being received at our places of employment has not escaped the attention of our employers. Please, if you need to contact us, consider doing it by mail. If you must talk to us, please call us at home, not at work. This may not always be effect on the financial security of those of us who receive these calls. Thank you for your consideration.

A weekly net is now being held on 40 meters for Midwestern packeteers and other interested parties. It is on 7158 kHz at 1500 CST, Sundays. Tentatively, 10.140 MHz (LSB) has been selected for usage in HF packet (300 BPS) operations.

BE SURE TO VOTE! There is a ballot on the next to last page of this issue to be used to cast your vote(s) for the vacant positions on the Board of Directors. Also included is a questionnaire that should be filled out (if appropriate) and returned separate from the ballot. These are located such that you can cut them out of PSR without chopping off the end of the article of the other side. If you prefer, you can make a copy or reasonable facsimile, but send one or the other to the TAPR PO box!

In case you hadn't heard, we lost a real friend recently. The following obituary was written for the AMSAT TeleMail BB, and Tom Clark, W3IWI, submitted it to us:

Today was a day of personal sadness for me. I was informed of the passing last night of a friend, a Life Member of AMSAT, an inspiration to our hobby. Vic Clark, W4KFC, the President of the ARRL, passed away following a heart attack at his home in Virginia.

It was only two weeks earlier that many of us had seen Vic at the AMSAT annual meeting. He had the usual twinkle in his eye as we exchanged our old, oft stated personal joke about my being his older brother. His brief comments at the meeting again showed that he viewed AMSAT as a major contributor to the future of amateur radio. Vic's membership in AMSAT stems from the first inception of the organization and he was always there, when we needed help. On losing Phase-3A, Vic was among the first to call in offering support by saying "that's OK, WE will do it again".

It is a great pity that Vic did not live to see one of his pet projects come to fruition: the W5LFL flight scheduled to start on Monday. Vic was very much involved in all the planning for this mission. Vic and I (with W3XO doing much of the ghost writing) co-authored the joint ARRL/AMSAT proposal to NASA that resulted in this exciting adventure we are all waiting for.

On hearing of his passing, my retrospective thoughts went back to a time over a quarter of a century ago, when, as a student, I met Vic for the first time. I remember marveling at his abilities as an operator and contesteer; his exploits made him one of my true heroes. Years later, our paths crossed again thru AMSAT. But me and my shaky fist, and we joked about young "wet behind the ears" W0IUF and the QSO's we had. I imagine many others have been similarly inspired by his fine operating skills and his willingness to work with newcomers.

Vic, we'll miss you. I won't be surprised some-day, out of a pileup, to hear a very distant voice saying "Kentucky Fried Chicken". Until then, 73.

MEMBERSHIP APPLICATION

Tucson Amateur Packet Radio Corporation
P. O. Box 22888, Tucson, Arizona 85734

Name: _____
Call _____ License _____
Sign: _____ Class: _____

Address: _____
City & _____ Zip _____
State: _____ Code: _____
Home _____ Work _____
Phone: _____ Phone: _____

If you wish not to have any of the above items published in a membership list, indicate here:

I hereby apply for membership in TAPR. I enclose \$12.00 dues for one year.

Signature: _____ Date: _____

Which Beta Test site (if any) is closest to you?

Tucson Amateur Packet Radio Corporation
P.O. Box 22888
Tucson, AZ 85734

The Tucson Amateur Packet Radio Corporation is a nonprofit scientific research and development corporation. The Corporation is licensed in the State of Arizona for the purpose of designing and developing new systems for packet radio communication in the Amateur Radio Service, and for freely disseminating information acquired during and obtained from such research.

The officers of the Tucson Amateur Packet Radio Corporation are:

Lyle Johnson WA7GXD ... President
Den Connors KD2S Executive VP
Heather Johnson .. N7DZU Secretary
Chuck Green N0ADI Treasurer

The Packet Status Register is the official publication of the Tucson Amateur Packet Radio Corporation. Explicit permission is granted to reproduce any material appearing herein, providing credit is given to the author and TAPR.

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This address/ID is to be used ONLY for submission of publication material to the editors.

TAPR HF Net: 21.280 or 14.235 MHz
1900Z Sundays

The Packet Status Register is edited and prepared by the following members of the MAPR group in the Twin Cities, MN, using any material that will fit, from anyone/anywhere we can get it:

Pat Snyder WA0TTW Paul Barnett N0CR

Gateway

Premier
Issue



The ARRL Packet-Radio Newsletter August 14, 1984

WELCOME

Welcome to Gateway, the ARRL packet-radio newsletter. Some of you reading this are deeply involved in amateur packet radio, some of you are just getting started on this exciting new mode, and some of you aren't quite sure what "packet radio" is. We hope that Gateway will have something to offer each of you.

WHAT IS A "GATEWAY?"

A gateway is a station that links two communications networks. In amateur packet radio, gateway stations are being used communicate between VHF and HF networks, and between VHF networks and satellite channels. Eventually, users of local VHF networks will use gateways to connect to an international packet-radio network. We have called this newsletter Gateway because we hope that it will, like a gateway station, facilitate communications between amateurs interested in packet radio.

Gateway will not be a technical newsletter; there are already several fine packet-radio newsletters covering technical issues. This will be a "news" newsletter. At ARRL Headquarters we have many sources of news not all of which are available to each of you. This newsletter will bring together notes from these sources. Overseas and domestic packet-radio club newsletters, the FCC, the IARU, on-line conferences and on-the-air bulletin boards will contribute. You may see items that you've seen elsewhere, but you should also see things that are new and interesting.

Some of you are receiving this packet-radio newsletter and have never even considered what packet radio can do for you, or what fun you could have on packet. We hope to provide you with an overview of the state of amateur packet radio, explaining what is being done and what can be done on this new mode.

It seems as though every packet-radio club is undertaking some project that will advance amateur packet radio. To make these projects fruitful, we must make the most of the limited resources available to amateurs. By telling a large audience about various packet-radio development efforts, Gateway should help organizers direct their efforts, and help volunteers find the groups that need them.

Perhaps when there is a worldwide amateur packet-radio network there will be no need for packet-radio newsletters. Until then, we hope that Gateway informs and interests you.

PACKET METEOR SCATTER

Last weekend's Persiids meteor shower provided a good opportunity to experiment with packet-radio meteor-scatter operation. Rich Zwirko, K1HTV, set forth some experimental guidelines, and stations throughout the U.S. attempted MS QSOs.

On August 1, well before the peak of the Persiids, W0RPK, the station of the Central Iowa Technical Society, held schedules with Bob Carpenter, W3OTC, in Maryland. The skeds were on 6 meters. Bob received about 2% of the packets sent from Iowa. Four nights later, again on 6 meters, W3OTC and W0RPK had what is believed to be the first amateur packet-radio meteor-scatter QSO.

As the Persiids approached, stations tried their luck on the 2-meter band. Stations in the East included K1HTV; Vern Riortella, WA2LQQ; Tom Clark, W3IWI; Hank Oredson, W0RLI; and Mark Wilson, AA2Z. In the West were Ralph Wallio, W0RPK; Bob McCaffrey, K0CY; Ron Dunbar, W0PN; Mike McQuiston, WA0WYW; Bob Schiers, N0AN; and Terry Van Benschoten, W0VB. Several of these stations copied beacons and connect requests via MS. On the morning of August 12, during the peak of the shower, W0RPK and K1HTV completed the first packet MS QSO on 2 meters. Congratulations are in order for all stations involved in these tests, and I hope that I haven't left anyone out.

These tests were performed at 1200 bauds, using AFSK FM. While it was necessary to use this mode in order to include as many stations as possible in the experiments, a performance sacrifice was made. We should organize further tests at higher transmission rates with more efficient modulation techniques.

ARRL APPOINTED IARU PACKET CENTER

The ARRL has been appointed IARU packet radio "information clearing house." The following is excerpted from the minutes of the IARU meeting in late July: "ARRL is nominated as the international clearing house of information relating to packet radio on behalf of the IARU, with a view to encouraging common standards and regulations."

This points the way toward international understanding and acceptance of packet radio standards generated in the United States and Canada. Several European amateurs have hesitated to get involved in packet radio because they were not sure which standards would "catch on." The appointment should help to alleviate this confusion abroad as to what is really happening in North American packet radio.

Club Listing

Here is a list of clubs active in Amateur packet radio.

Amateur Radio Research and Development Corp.
(AMRAD)

P.O. Drawer 6148
McLean, VA 22106-6148

Amateur Radio Satellite Corp. (AMSAT)

P.O. Box 27
Washington, DC 20044

Chicago Area Packet Radio Association (CAPRA)

P.O. Box 8251
Rolling Meadows, IL 60008

Central Iowa Technical Society (CITS)

c/o Ralph Wallio, WØRPK
Rural Route 4
Indianola, IA 50125

Florida Amateur Digital Communications Assn.
(FADCA)

c/o Ted Huff, K4NTA
1829 N. W. Pinetree Way
Stuart, FL 33494

Los Angeles Area Packet Group (LAPG)

c/o Harold Price, NK6K
1211 Ford Ave.
Redondo Beach, CA 90278

Minnesota Amateur Packet Radio (MAPR)

c/o Philip S. Plumbo, NØDFT
1128 Dayton Avenue
St. Paul, MN 55104

New England Packet Radio Assn. (NEPRA)

P.O. Box 15
Bedford, MA 01730

Rocky Mountain Packet Amateur Radio Assn. (RMPAR)

c/o Andy Freeborn, NØCCZ
52222 Borrego Drive
Colorado Springs, CO 80918

San Diego Packet Group (SDPG)

c/o Mike Brock, WB6HHV
10230 Mayor Circle
San Deigo, CA 92126

Tucson Amateur Packet Radio Corp. (TAPR)

P.O. Box 22888
Tucson, AZ 85734

Vancouver Amateur Digital Communications Group
(VADCG)

9531 Odin Road
Richmond, BC V6X 1E1
CANADA

Remember to include an s.a.s.e when writing to any of these clubs. Club money spent on postage is money that can't go into packet-radio development.

Voice Nets Concerning Packet Radio

The following voice nets are devoted to discussion of packet radio.

<u>Day</u>	<u>Time</u>	<u>Frequency</u>	<u>Coverage</u>	<u>Sponsor</u>
Mon	2000 PDT	145.36	Los Angeles	LAPG
Tue	2100 PDT	144.76	San Diego	SDPG
Tue	2200 EDT	3.850	Eastern U.S.	AMSAT
Thu	2000 EDT	147.12/72	Boston area	NEPRA
Sun	1900 UTC	14.235	National	TAPR
Sun	2100 UTC	7.158	National	TAPR
Sun	0800 EDT	3.958	Regional	FADCA
Sun	1900 EDT	147.165	Tampa area	FADCA
Sun	2100 EDT	147.285	Orlando area	FADCA
Sun	1500 CDT	7.158	Central U.S.	CITS

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Joe's not there? Store a message at his station!
RTTY is too slow? "Packet away" at up to 1200 baud or more.

In Packet Radio, your station is a radio, a computer terminal, and a TNC (Terminal Node Controller, hopefully the AEA PKT-1). You type and the TNC sends short bursts (packets) of two-tone modulation called AFSK. The other station decodes them and displays them on his monitor screen. He then sends to you.

There is a lot of activity—local clubs, voice nets, mailboxes/bulletin boards, links between bands, long range (digi)repeaters and chained digipeaters, voice nets, search/rescue and emergency work, newsletters, satellite communications, technical development of new equipment and software, etc. 220 MHz will be very important to packet radio. Help us populate it and "Save the Band"!! We need your help and participation.

Packet radio is:

Standardized—your station can talk to any other packet station.

Popular—fast growth over the last year to about 2000 stations in the U.S.

Multi-frequency—10.147, 14.103, 145.832, Oscar 10, 145.01 (and other local 2M frequencies) are being used now.

Public Service—traffic handling, search and rescue, public events, emergency service.

Multimode—conventional radio, meteor scatter, but no EME/moonbounce yet (will you be first?).

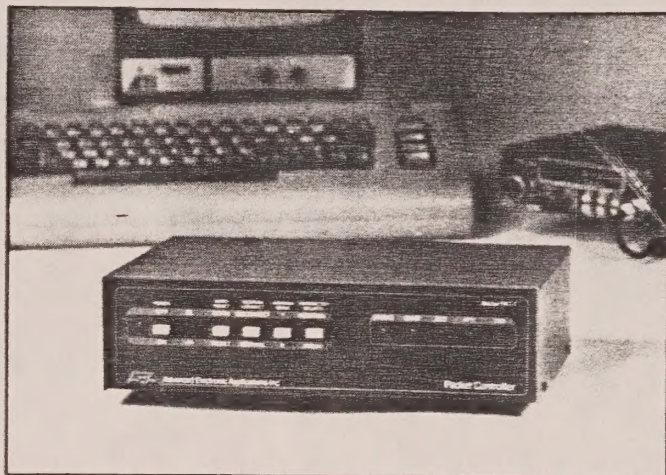
Simple—you control the PKT-1 by typing 5-6 simple one- to four-letter command words on the terminal or computer. Several of them are shown in the above monitor screen simulation, which shows a connect via digipeaters, and an interchange between two stations.

It's easy to get going. You probably already have the radio, and the computer or terminal. You'll need to operate your computer in RS232C mode using "communications terminal" software that is free or cheap. We can usually furnish information on what to use for popular computers. The rest of the software is resident in the PKT-1 (you will need to buy a PKT-1). And you need a MIC connector to connect to the (furnished) radio cable you'll plug into your radio MIC jack. And "BRAAP," you're on the air with "Packet Racket."

You're likely aware of Packet Radio already. If not, read WB4GXD's three excellent tutorial articles in the Sept. and Oct. '83 and Jan. '84 issues of 73. Clip the coupon below, and we'll send articles, a reading bibliography, product literature on our PKT-1 Packet Controller, answers to commonly asked questions about packet radio, lists of packet clubs in your area, sample packet newsletters from the ARRL and clubs, AEA dealer locations, packet videotape and audio cassette loan info, voice net info on HF/VHF where you can listen and ask questions, a blow-by-blow description of how easy it is to get started, a free AEA Packet Lapel Button, AND WE'LL PUT YOU ON OUR PACKET MAIL LIST to ensure you'll get further mailings!!!

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See your favorite AEA dealer, clip and send the coupon, or call John Gates, N7BTI (the AEA Packetman) at (206) 775-7373.



AEA Packet Radio

RAM length is 2000

cmd: connect to N7ML via KB7G, K6RFK

cmd: ***CONNECTED TO N7ML

Hi Mike - have you seen the great new AEA
PKT-1?

YES JOHN - LOOKS GOOD K

Bye Mike sk

cmd: ***DISCONNECTED

cmd:

AEA INC., P.O. BOX C-2160, LYNNWOOD, WA 98036
OK AEA, send packet information to:

Name _____ Date _____
Street _____
City, State _____
Zip _____ Call me at _____

Advanced Electronic Applications, Inc.
P.O. BOX C-2160 • LYNNWOOD, WA 98036
(206) 775-7373 • TELEX: 152571 AEA INTL

